

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 5 77 WEST JACKSON BOULEVARD CHICAGO, IL 60604-3590 6/28/96 A.2

REPLY TO THE ATTENTION OF:

JUN 2 8 1996.

SR-6J

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Ronald Frehner

Project Coordinator - ACS NPL Site
Conestoga-Rovers & Associates
1801 Old Highway 8, Suite 114
St. Paul, Minnesota 55112



Re: Approval of the Revised Upper Aquifer Investigation Technical Memorandum with Modifications;
American Chemical Service, Inc., NPL Superfund Site, Griffith, Indiana

Dear Mr. Frehner:

The United States Environmental Protection Agency (U.S. EPA) and the Indiana Department of Environmental Management (IDEM) have completed review of the revised Upper Aquifer Investigation Technical Memorandum (dated April 1996) submitted by Montgomery Watson on behalf of Respondents for the American Chemical Service, Inc., National Priorities List (NPL) Superfund Site located in Griffith, Indiana (ACS Site). The ACS Site is undergoing Remedial Design/Remedial Action (RD/RA) pursuant to the Unilateral Order (UAO) (Docket No. V-W-95-C-260).

The U.S. EPA hereby approves, with modifications, the revised Upper Aquifer (UA) Technical Memorandum including the well installation proposal and Standard Operating Procedures. Respondents must now proceed with Task 8A of the approved workplan pertaining to the upper aquifer investigation. Hence, within 45 days, pursuant to Task 8A, Respondents must 1) install UA wells and conduct sampling in UA wells for full scan analyses; and 2) collect a round of water level measurements. Respondents must implement the modifications contained herein in Enclosure 1 and submit replacement pages prior to the startup of field work. Field activities must be initiated within twenty-one (21) days of receipt of this letter.

As you are aware, adequate notification must be given to the U.S. EPA and IDEM as to the initiation of RD/RA field work, so that the appropriate oversight personnel may be on-site to observe the activities.

U.S. EPA also hereby responds to several issues raised in your May 3, 1996, letter relating to U.S. EPA's disapproval of the Upper Aquifer Investigation Technical Memorandum.

First, Respondents requested meetings to discuss technical and legal issues with U.S. EPA management. In response, U.S. EPA technical and legal staff and management met with Respondents on June 12th and 20th, 1996, to discuss technical and legal issues, respectively. The attendance meeting sign-in roster for the June 12th technical meeting is attached.

A principal issue raised at the technical meeting was perceived communication problems between the Respondents and the U.S. EPA technical staff oversight team. U.S. EPA believes that communication is important to the success of this project. To address this issue, U.S. EPA and IDEM have agreed to participate in weekly conference calls with Respondents' technical staff, to review technical progress and issues. IDEM will prepare the minutes from the call.

Second, Respondents' letter states that the Respondents are "acquiescing in installing those additional wells and piezometers only because U.S. EPA have ordered us to do so and threatened enforcement action. We continue to believe that the identified wells and piezometers are without sound technical basis." U.S. EPA continues to believe there is a sound technical basis for these wells and piezometers, and that they are necessary for remedial design purposes and for the understanding of the hyrogeology of the site. The latest pre-design investigation has identified hitherto unknown conditions at the site and developed a better understanding of the hydrogeology and the nature and extent of contamination than was known from the RI. For example, the latest investigatory work has discovered that the area of contamination in the upper aquifer is larger than was identified in the RI. Moreover, the RI gave little consideration to the potential for the existence of non-aqueous phase liquid contamination, and this potential must be understood in order to achieve a comprehensive and appropriate remedial design. additional wells serve the essential purpose of confirming these screening level findings, and informing necessary remedial design decisions.

With respect to Respondents' concerns about "threats" of enforcement action, U.S. EPA disagrees with Respondents' characterization of this issue. U.S. EPA also agrees that technical disagreements should be resolvable between the parties (i.e., U.S. EPA and Respondents). In the case of the upper aquifer investigation, U.S. EPA's efforts to consider the Respondents' technical concerns at this site have been continuous, exemplary, and patient. If after such efforts technical disputes remain over which the parties cannot reach a mutual agreement, an impasse exists, and the UAO provides U.S. EPA the means with which to resolve such impasses. U.S. EPA reference to these means when such an impasse is reached is not intended to "threaten" the Respondents, but to inform you of U.S. EPA's conclusion regarding the dispute, and to bring otherwise potentially endless discussions to an end. U.S. EPA is strongly committed to avoiding such impasses, but its technical decisions must and will be based upon a scientifically sound analysis of remediation requirements at the site.

Third, Respondents maintain that the results of the groundwater investigation (hydraulic probe sampling) confirm the results of the remedial investigation (RI), and that additional "nature and extent" work is not necessary for the final remedial design.

U.S. EPA notes, however, that despite the fact that the RI yielded sufficient information to select an appropriate remedy for the site, it did not determine the horizontal and vertical extent of contamination at the site. This information is necessary to properly design the site remediation and to make sound environmental decisions.

If you have any questions, or require clarification, you may reach me at (312) 886-4745.

Sincerely, Drawn

Sheri L. Bianchin,

Remedial Project Manager

Superfund Division

Remedial Response Section #3

Enclosures

cc: Peter Vagt, Montgomery Watson
Joe Adams, Montgomery Watson
Holly Grejda, Project Manager; IDEM, Office of Superfund
Steve Mrkvicka, Black & Veatch Waste Science, Inc.
Richard Byvik, SFD, TSS
Mike McClary, ORC
Steve Mangion, U.S.EPA-HQ
Luanne Vanderpool, SD, TS

ENCLOSURE 1

U.S. EPA Review Comments on Revised (Second Draft), Upper Aquifer Investigation Technical Memorandum dated May 3, 1996, American Service NPL Site, Griffith, Lake County, Indiana

General Comments

- 1. During review of the Revised UA Investigation Technical Memorandum (May 3, 1996), it was noted that a number of the U.S. EPA's comments were not adequately addressed (i.e., General Comments 1, 3, 7, and Specific Comments 9, 10, 11, 12, 13, 14, 15, 16, 19, 21, 22, 26, and 27, 30). Therefore, it appears that the Responses to U.S. EPA Comments on the UA Investigation Technical Memorandum is incomplete.
- 2. The Respondents maintain that the results of the groundwater investigation (hydraulic probe sampling) confirm the results of the RI, and that additional nature and extent work is not necessary for the final remedial design.

This is incorrect, as the screening results do not constitute confirmation of the results (and cannot confirm the results in areas where previous investigations have not been performed), and additional monitoring wells are necessary to confirm the results of the screening investigation. Respondents previously agreed to implement this work, in technical meetings between the agencies and the Respondents, and in the approved pre-design work plan.

Moreover, Respondents have previously agreed to both the rationale and the process being used for the work being conducted. Specifically, the Pre-Design Work Plan (August 21, 1995) and the Scope of Work dated January 22, 1996, discuss the groundwater extent investigation . . .

- "The extent of groundwater contamination will be delineated in the field using VOCs detected in groundwater samples collected from temporary sampling points as an indicator of the extent of contamination. . . . The samples will be field analyzed with a gas chromatograph (GC) at Level II Data Quality Objectives (DQO). These analyses will allow field judgements to be made for locating the next sampling point, or determining that the extent of the VOC contamination has been sufficiently determined to locate monitoring wells. . . The additional wells will be installed to verify the extent of groundwater contamination. [It appears that the last sentence was removed from the January SOW in an unauthorized manner.]
- As U.S. EPA stressed in the November 13, 1995, correspondence regarding the Tracer Investigation, "use of the chosen method is

a screening method and only an indicator of the extent of contamination. . . U.S. EPA agrees that the screening method will be an iterative approach to aid in placing wells to verify both presence and absence of contamination."

The limitations of the data derived from the screening investigation in the upper aquifer are evident in several additional areas.

For example, hydraulic probes were used to collect samples which were analyzed by a field gas chromatograph (GC) for a target list of VOCs using CLP-modified methods. The data derived is qualitative (or semi-quantitative at most). The sampling device is a screening tool and is not capable of determining to a high degree of accuracy the groundwater concentrations in a plume due to an extremely limited sample zone, purge volume, as well as groundwater contaminant transport heterogeneity.

Herein describes further the limitations of the data derived in the screening investigation in the upper aquifer:

Hydraulic probes were used to collect samples which were analyzed by a field gas chromatograph for a target list of VOCs using CLP-modified methods. The data derived is qualitative (or semi-quantitative at most).

The sampling device is a screening tool and is not capable of determining to a high degree of accuracy the groundwater concentrations in a plume due to an extremely limited sample zone, purge volume, as well as groundwater contaminant transport heterogeneity. Furthermore, VOC losses are likely due to the collection techniques. The field GC was calibrated for only a target list of VOCs and did not include all contaminants of concern. The analytical methods were modified from EPA CLP methods to speed up the process. Even though check samples were used to verify quality of the samples analyzed by the field GC, no off-site confirmatory samples were used to confirm the data or non-detects. All of these factors contribute to the qualitative nature of the data.

The screening method derives data that is an indicator of the extent of contamination. While the screening method can be used to aid in the placement of monitoring wells; it can't reliably rule out the need for a monitoring well. The screening method cannot rule out absence of contamination or even confirm the nature of contamination.

A review of the UA investigation results supports this comment. For example, the following list includes pairs of samples taken with the hydraulic probe from Areas A, B and D, that are directly downgradient from one another. The data shows that where you would expect decreasing contamination in the downgradient sample,

increases in total VOC concentrations were found:

Area	Upgradient		Downgradient	
Area A	GP56	6,700 ug/L	GP58	50,600 ug/L
	GP53	813 ug/L	GP60	3,560 ug/L
Area B	GP55	420 ug/L	GP67	715 ug/L
	GP81	18,803 ug/L	GP82	29,460 ug/L
	GP120	1,095 ug/L	GP128	5,376 ug/L
	GP127	19 ug/L	GP134	1,630 ug/L
Area D	GP106	156 ug/L	GP107	6,213 ug/L
	GP113	non- detect	GP114	53 ug/L
	GP138	non- detect	GP139	50 ug/L

This same pattern is repeated when one examines the benzene concentrations. The data indicates that sample heterogeneity occurred during hydraulic punch sampling both frequently and across the entire site. This information presented above is further evidence of the qualitative nature of the data.

- 3. During review of the May, 1996 UA Investigation it was noted that the original objectives stated in the January, 1996 UA Investigation SOW and SOPs had changed. This is not acceptable. A comparison of the objectives presented in the January, 1996, document versus the objectives presented in the May, 1996, document is provided in the attached Table 1. Please be careful when presenting the purposes in the report and aware that the original intended purposes govern the work.
- 4. Although the upper aquifer investigation was useful in providing an indication of the extent of groundwater contamination in the top 5 feet of the upper aquifer, it is not possible to make conclusions beyond this (i.e., vertical and horizontal extent of contamination). This is particularly important when considering the fact that the upper aquifer saturated thickness varies between 10 and 30 feet across the site.

- 5. The document includes Standard Operating Procedures for activities which are present in the document but there is no reference to the Quality Assurance Project Plan (QAPP) or an addendum to the QAPP which incorporates the QAPP requirements. This information must be included. It is understood that expediting certain components of the project has created confusion regarding what is to be included and what is to be referenced. However, all parties agree that expediting portions of the remedy is positive and will best serve the project. Please pay attention to this increasing problem. A revised predesign QAPP and field sampling plan must be submitted in the future incorporating all approved SOWs and SOPs.
- 6. The RI did not determine the horizontal and vertical extent of contamination. However, enough information was available for EPA to select the remedy. During the RD, other necessary data would be gathered. One of the lessons learned from the Superfund Program's history (as evidenced by reports of the National Research Council) is that site characterization is of prime importance in remedy design. The purpose of the field screening investigation was to begin the next data acquisition process and was meant to obtain an indication of contamination's extent. Monitoring wells to confirm extent of contamination were a part of the work plan as approved by U.S. EPA.
- 7. Regarding the site conceptual model, the report makes too much of very slight head differences (i.e., differences of less than 0.05 feet in some cases.) The report fails to appreciate that in a DNAPL site, head differences alone cannot be used to infer contaminant fate and transport. At a DNAPL site, it is always likely that a subsurface source will be found relatively deep. As precipitation infiltrates from above, the presence of the subsurface source (DNAPL) can easily be masked by the relatively clean water above. Hence, EPA's longstanding position that subsurface characterization always extend as a minimum to the base of the upper sand unit and that wells be located with a screen at the base of that sand. EPA has also voiced concern about the very sharp declines in contaminants concentrations in some locations, particularly to the east of the site.
- 8. Comment 3 Response. Regarding sampling for PCBs, facilitated transport is certainly an issue. Semi-volatile transport need not be only as a dissolved phase as is the case with the VOCs. More importantly, VOCs are likely to degrade before PCBs, thus their absence could be meaningless. Even more importantly, at a free-phase site, the distribution of contaminants in the subsurface should be inferred solely from the dissolved concentrations.

- 9. Comment 5 Response. Contamination in the ditch is a new finding (one that was made under the direction of U.S. EPA). The technical memorandum merely noted that contamination was found, but does not provide any discussion of recommendations or follow up. Indicate that a sample was taken from the ditch during the ecological investigation and will be analyzed for full scan analyses. Indicate that a decision regarding the ditch will be made once the results are received. It may, at that time, be appropriate to propose a plan to verify your hypothesized ground water-surface interaction, or indicate if a risk exists to the public.
- 10. Comment 6 Response. Regarding abandonment of wells, this issues will be addressed in the Lower Aquifer Technical Memorandum.
- 11. Comment Response 7. Although U.S. EPA does not agree with the statement, that the existing piezometers, along with the field screening data leave no ambiguity as to the water table configuration northeast of the ACS site, U.S. EPA will defer requiring P-57 at this time.
- 12. Comment 9 Response. U.S. EPA's review of the data indicates that field screening results do indicate that the zone of contamination does extend into the wetlands.

13. Comment 12 Response.

U.S. EPA requested that the deep samples be collected in order to determine any vertical concentration variations.

As is stated on page 2 of the Respondents' January 22, 1996, SOW and SOPs, step 2. "U.S. EPA has expressed concern that there may be a downward gradient in the upper aquifer . . . [t]he purpose of the lower sampling level is to determine whether VOC contamination extends below the upper five feet in the upper aquifer." This is the rationale for the deeper samples.

The revised upper aquifer memorandum states: [d] etermine whether VOC contamination extend below the upper five feet in the upper aquifer at selected locations along the plume front. Further describe that the U.S. EPA selected the locations at the "apparent" downgradient edge of the plume.

14. Comment 13 Response. Referring to the UST and the industrial facilities, your response states that . . . [t]he upper aquifer investigations did not confirm that either of these potential sources are significant contributors to the groundwater contamination extending southeast from the Off-site area.

This conclusion must be stated in the technical memo as well as the response to comments.

15. Comment Response 19. Regarding the piezometers: The data indicates a very large concentration gradient in many places, including the wetlands. Such a gradient is explained by Respondents as being an accurate reflection of contaminant distribution's extent and being caused by vertical gradients within the wetlands. The U.S. EPA required piezometers are merely meant to verify the hypothesis. This is an example of gathering needed data in order to make environmentally sound decisions.

The discussion in second paragraph does not acknowledge facilitated transport of PCBs. This is a real concern at this site.

Discuss how the results of GP57 and GP68 affect the objective #2 for Area A defined in the January 22, 1996, SOW, page 2, which is to "[d] etermine whether VOC contamination extends below the upper five feet in the upper aquifer."

16. Comment Response 25, Area C (page 14). The text states that "...it may not be appropriate to include M-1S and MW15 in the quarterly monitoring plan. However, at the U.S. EPA request, wells M-1S and MW 15 will be considered for inclusion in the quarterly monitoring plan." It is unclear why the Respondents feel that it may now be inappropriate to monitor these wells, when the original draft technical memorandum stated that the two monitoring wells would "...continue to serve as sentinel wells for monitoring potential contaminant migration southwest of the landfill area."

In any case, U.S. EPA and IDEM will make a decision regarding the required groundwater monitoring network for the UA in Task 9A.

17. Comment Response 26. The text states that "[1] ocation "L" is within the planned alignment for the groundwater extraction trench." It appears that location "M" may actually be the well in the area of the groundwater extraction trench. In any case, the actual well needs to be scoped in the field prior to installation to determine its location in proximity to the trench. See also comment #31 below.

Specific Comments

18. Page 1, paragraph 1, second sentence. The purpose stated here is different than previously agreed to. Replace with the following. "The purposes of this phase of the upper aquifer investigation are to 1) delineate the approximate extent of groundwater contamination in the upper aquifer using temporary sampling points (i.e., hydraulic probes) and field screening of select volatile organic compounds, and 2) to propose upper

aquifer monitoring well locations at the site to confirm presence and absence of contamination."

- 19. Page 2, paragraph 3. The additional upper wells that U.S. EPA is requiring in response to the latest investigation are in order to understand the extent of contamination necessary for remedial design.
- 20. Page 2, paragraph 2, first sentence. This sentence is incorrect, IDEM does not have approval authority on this project as the RD/RA is being conducted under a Unilateral Administrative Order issued by the U.S. EPA. Please revise accordingly.
- 21. Page 4, Third Bullet. The text states "[b] ecause clay was found to be located at less than a ten-foot depth..." Clay was not found in any of the work during the UA investigation. Revise this sentence to read "Because a water sample could not be drawn through the hydraulic probe screen at the 10 foot interval,..."
- 22. Page 7, Paragraph 1. The text states, "The results of the deep groundwater samples in the upper aquifer indicate that VOC sampling five feet below the water table provide results that are representative of the entire saturated thickness of the upper aquifer." The data does not support this statement. The results at hydraulic probe sampling locations GP57 and GP68 show an order of magnitude increase when comparing the shallow and the deep sample results. Delete the statement.
- 23. Page 7, Paragraph 2. The text states that "the highest VOC concentrations were found in groundwater samples collected just north of the UST located at the City of Griffith Landfill...." The text then goes on to say, "Benzene was detected as high as $6,950~\mu g/L$ near the former UST...", implying that this contamination comes from the UST. However, according to Figure 3, of the three groundwater samples collected near the former UST (GP87, GP89, and GP123), benzene concentrations were found to be highest in the location upgradient of the UST (GP123) and lowest in the location downgradient of the UST (GP87). The UST must be ruled out as a source to this plume, and the text revised to reflect that fact.
- 24. Page 8, Area B, Conclusions, Paragraph 1. The text states, "[t]here are several potential sources of elevated BETX concentrations upgradient of monitoring well MW6, near the intersection of Colfax and Reder Roads. Possible sources include the UST area at the City of Griffith garage..." Based on field observations and discussions with a City of Griffith representative during the time of hydraulic probe sampling, it was determined that the UST at the City of Griffith garage was located near GP87, approximately 300 feet west-southwest of MW-6. In light of the groundwater flow direction, which on page 2 of this technical memorandum is to the south, the UST location is

upgradient of MW-6. This statement is without technical merit.

Additionally, see Response to #23 above.

- 25. Page 8, Area B, Conclusions, Paragraph 2. The text states, "[t]he approximate extent of VOC contamination in the upper aquifer south of Reder Road was defined during the investigation." For clarification, U.S. EPA.'s opinion is that the hydraulic probe samples analyzed by a DQO Level II analytical method are considered qualitative data only. Furthermore, groundwater samples were only collected in the top 5 feet of the aquifer. Deeper samples may be required to define the extent of contamination, particularly in light of the contaminant stratification noted in Area A.
- 26. Page 8, Area C, Conclusions. The text states "... the "Final Remediation Level" for acetone in the ROD (2,300 μ g/L). The ROD provides a range of concern for acetone from 192 to 2,300 μ g/L. Any concentrations of acetone greater than 192 μ g/L is within this range of concern.
- 27. Page 8, Area D, Results. Since GP-90 is part of and a driving force behind the Area B plume, it would seen more appropriate to include this sample in the Area B sections of the technical memorandum. Revise the sections or discuss your rationale.
- 28. Page 11, Residential Wells. Discuss why the residential sample location at 950 Arbogast in the March 1996 technical memo changed to 938 Arbogast in the May 1996 technical memo.
- 29. Page 11, Residential Wells. Discuss why the May 1996 Technical Memorandum deleted the sentence, "[w]ell logs for the residential wells will be made available prior to sampling," which was included on page 11 of the March 1996 technical memo. U.S. EPA requires this information be made available.
- 30. Page 12, Residential wells, paragraph 1, last sentence. It is inappropriate to limit future sampling and analyses at this time. Revise the text to reflect that the future sampling analyses to be performed will be re-evaluated after the review of the sampling analysis for each residential well location has been completed, and after review of the well inventory contained in the Lower Aquifer Technical Memorandum.
- 31. **Figure 2.** The figure does not present the location of GP54. Include this sample location on the figure.

32. Figure 6. The wells indicated on Figure 6 is the revised Upper Aquifer technical memorandum are acceptable. These wells are needed to confirm nature and extent of contamination. Enclosure 3 includes EPA's rationale for requiring these wells. EPA will defer requiring MW-2 and MW-7 for now, as indicated in EPA's previous letter pending results of the new monitoring well results. Also, U.S. EPA may require additional wells if deemed necessary and appropriate after the review of the data from the monitoring wells.

The actual locations of the proposed monitoring wells will be chosen in the field, as stated in the document. The following issues need to be considered or to locating and installing these monitoring wells. Monitoring well locations A and C appear to be within the boundaries of the contaminant plume, as shown on Figure 6, though these locations were originally intended to confirm the absence of contamination. Also, well location "M" will need to be scoped in the field prior to well installation to determine its location in proximity to the trench.

- 33. Appendix C. The protocols presented must conform to an U.S. EPA approved quality assurance project plan and field sampling plan. Describe that a revised pre-design QAPP and field sampling plan will be submitted.
- 34. Appendix C. SOPs, Groundwater Monitoring Well and Piezometer Installation Protocols. The SOPs must indicate that, during installation, a boring to at least 2 feet below clay at each location will be collected. This information is necessary to expand the data base of the depth of clay. The boring must be logged and submitted to U.S. EPA and IDEM. Any evidence of free-phase contamination must be noted as well. For locations with a saturated thickness greater than 15 feet, a well nest shall be installed consisting of a 10-foot well screen at the water table shall and another well at the base of the aguifer.
- 35. Appendix C, SOP for Private Well Sampling, Procedure #4. The residential well must be purged for a minimum of fifteen minutes. In addition, allowing the pump to cycle once may not ensure that the well has been properly purged. If the holding tank is large, it may not be emptied after one pump cycle, therefore, the sample collected may not be emptied after one pump cycle, therefore, the sample collected may not be representative of the constituents present in the groundwater. Make the appropriate corrections.

- 36. Appendix C, SOP for Groundwater Monitoring Well Sampling, Low Flow Sampling with a Submersible Pump, Items F and G. The sample being measured for the listed field parameters should be collected in a sample container, not measured directly from an in-line location. In addition, to provide further clarification, the document should state that the sample will be collected and field measurements read after each complete well volume.
- 37. Appendix C, SOP for Groundwater Monitoring Well installation Protocol, Soil Borings. This section does not include a procedure for utilizing field screening instruments such as an FID or PID. Revise the text to include the use of field screening instrumentation.

Table 1. Comparison of Objectives presented in the January 22, 1996 UA Investigation SOW and SOPs versus May 3, 1996 UA Investigation Technical Memorandum.

	January 22, 1996 UA Investigation SOW and SOPS	May 3, 1996 UA Investigation Technical Memorandum			
	Area A - Wetland Area East of the ACS Facility				
1.	To complete the dotted line on the left side of Area A, which defines the "zero" VOC concentration, as the western edge of the plume.	1. Establish the line to the west of Area A which defines the extent of contamination as indicated by "zero" VOC concentrations (non-detect) in groundwater.			
2.	The purpose of the lower sampling level is to determine if VOC contamination exists below the upper five feet in the upper aquifer.	2. Determine whether VOC contamination extends below the upper five feet in the upper aquifer at selected locations along the plume front.			
	Area B - East of Colfax, South of Reder Road				
1.	To define the outer extent of the VOC plume related to the ACS NPL site to the south and east of Colfax Road, on the south side of Reder Road.	Delineate the extent of VOC concentrations east and south of MW-19.			
2.	To eliminate the potential that the industrial facilities contribute to the VOC plume detected at MW-19.	2. Evaluate the potential for the UST and several industrial facilities located in the area to be contributing to the VOC plume detected at MW-19.			
3.	To determine if contamination from an area that contained an underground storage tank (UST) located north of monitoring well MW-6 is contributing to the VOCs detected in MW-6.	None			

Table 1. Comparison of Objectives presented in the January 22, 1996 UA Investigation SOW and SOPs versus May 3, 1996 UA Investigation Technical Memorandum.

	January 22, 1996 UA Investigation SOW and SOPS	May 3, 1996 UA Investigation Technical Memorandum			
	Area B - East of Colfax, South of Reder Road (Continued)				
4.	The location of the UST will be identified. One sample will be collected upgradient of the UST (north) and another sample will be collected between the UST and monitoring well MW-6. The suite of VOCs detected in each sample will be evaluated and compared to assess any contribution of VOCs to the groundwater by the UST.	None			
	Area D - North and East Perimeter				
1.	The challenge is to confirm that the line marking the outer extent of Area D is in fact an outer boundary of the area of groundwater containing VOCs.	Confirm the extent of VOC concentrations in the upper aquifer around the north and east perimeter of the site.			
No	one.	2 Delineate the outer extent of contaminated groundwater in the upper aquifer.			

ENCLOSURE 2

Following is U.S. EPA's summary of the latest (1995/96) Upper Aquifer Investigation and interpretation of the results to-date. This information is provided for informational purposes and requires no response.

The upper aquifer investigation consisted of a round of water level measurements, the installation of 11 piezometers, and the collection and analysis of 110 water samples. The groundwater samples were collected using a hydraulic probe. These are the most significant results of the 1995/96 upper aquifer investigation:

The inferred extent of contamination is now larger than expected as is described herein.

- Discovery of a new contaminated groundwater plume, southeast of monitoring well MW-6, which measured approximately 500 feet wide and 2000 feet long. Contaminated groundwater has also been detected further west, north, and east of the site than previously identified.
- Confirmation that groundwater contamination detected in monitoring well MW-6 was not a result of the Griffith Landfill underground storage tank. The UST was located in an area hydraulically downgradient of MW-6.
- Discovery of contaminant stratification in the upper aquifer west of the ACS property. Samples collected at the base of the aquifer (i.e., 10 feet below the water table) were an order of magnitude more concentrated than the samples collected at shallower intervals (i.e., 5 feet below the water table). This discovery raises several questions: 1) whether the contaminant stratification may be due to the fate and transport of DNAPLs, and 2) whether there exists a downward component of flow to the upper aquifer exists, transporting contaminants into the intermediate or lower aquifers.
- Identification of a groundwater seep area near piezometer P-63. The seep discharges to a drainage ditch. It has resulted in degradation to the surface water in the ditch and introduced an additional exposure pathway possibly requiring remedial action.

ENCLOSURE 3

Following are the rationales for wells J, K, L, M and the piezometer clusters in the wetlands which were disputed by Respondents. This information is provided for informational purposes and requires no response.

The well(s) will confirm groundwater flow through head measurements and distribution and contaminant distribution. At some locations, a 2-well cluster will be needed. Data on the vertical distribution of contamination has not been provided to date.

Also, at sites such as the ACS site, where a complex groundwater flow regime and with non-aqueous phase liquids present, site hydrogeologic data alone may be insufficient to characterize fate and transport mechanisms. The direction of the NAPL movement depends less on the direction of groundwater flow and more on gravity forces, viscous forces, and the dip of underlying strata. Therefore, NAPL movement may be contrary to the direction of groundwater flow. Hence, any evidence of free-phase should be noted during the upcoming investigations.

Following are the rationales:

Respondent's Well(s) # J (EPA Well #1):

This well is suggested approximately 100 feet southeast of the midpoint between MW-13 and M-5S. The distance between MW-13 and M-5S is over 1,000 feet, and MW-14, which is the closest monitoring well between these well, is contaminated. The purpose for the well is to define the western extent of contamination in the upper aquifer in the wetland area. The well would confirm the horizontal and vertical limit of contamination as determined during the field screening investigation using hydraulic probes. The hydraulic probe data implies changing plume chemistry. Given that this is a complex plume with PCBs as well as VOCs as contaminants of concern, it is necessary to obtain plume characterization throughout its extent since plume chemistry and volume will effect risk estimates and remedial designs.

(A well in this general location was proposed by the PRP/Respondents in both the February and August 1995 Pre-Design Work Plan submittals in order to fill a data gap in the past. See MW-25 on Figure 4-2.)

While there has been some reluctance to explore the nature of contamination in the source areas, it is feasible to do so in the more distal areas.

Several deeper groundwater samples extracted by the hydraulic probe were significantly higher in concentration than the water table samples at the same location. This points to the need for well nests to look for stratification of contamination. See also discussion below under piezometers. This well will also serve to establish pre-remediation conditions.

Respondent's Well(s) # K (EPA Well #8):

An additional monitoring well is suggested approximately 150 feet northeast of P-62, to better provide adequate monitoring coverage of this area. The purposes of the well is to define the eastern extent of contamination south of Reder Road which is near the residential area. The well would confirm the limit of contamination as determined during the hydraulic probe investigation. It will detect changes to the plume after the installation of the barer wall. No monitoring wells exist to fulfill this purpose. This well will also serve to establish pre-remediation conditions.

Respondent's Well(s) # L (EPA Well #4):

The well was suggested to determine the nature of the contamination north of the railroad tracks. The hydraulic probe investigation infers contamination further north that is not easily understandable if dissolved phase transport is the sole mechanism operating. There is a distinct lack of piezometric and contamination data in this area. No monitoring wells exist to fulfill this purpose. This well will also serve to establish pre-remediation conditions.

Respondent's Well(s) # M (EPA Well #3):

A monitoring well was suggested near P-63 which is hydraulically down-gradient from one of the largest source areas on site. There is a distinct lack of piezometric and contamination data in this area. The understanding of the contamination is important is system design. This well will also serve to establish preremediation conditions.

(A well in this general location was proposed by the PRP/Respondents in both the February and August 1995 Pre-Design Work Plan submittals. Respondents apparently thought this well would serve to fill a data gap in the past. See MW-26 on Figure 4-2.)

Piezometers in the wetlands

Several nested piezometers are needed to determine vertical hydraulic gradient of the groundwater with respect to the wetlands.

Although U.S. EPA would prefer wells be installed, nested piezometers will still answer important questions about the transport of contaminants in the wetland; hence, piezometric measurements are a logical first step. These piezometers would confirm hydrogeologic connection of groundwater and wetlands. This is important in understanding the fate and transport mechanism.

The limited hydraulic probe data suggests are marked drop-off in contamination in a short lateral distance as well contamination stratification vertically. The Respondents have theorized that all groundwater is discharging to the wetlands. This implies very high upward gradients. The piezometers will confirm, this hypothesis.

It is noteworthy to point out that at one location, the concentration of benzene was nearly an order of magnitude higher at the base of the aquifer as compared to the water table. This is indicative of the unknown and somewhat perplexing if there is an upward gradient. It may suggest DNAPL; however, benzene is not normally found in DNAPL. It may indicate a downward gradient component in the area. A downward gradient could affect transport of contaminants into the lower aquifer in an area of the site where the clay is nearly the thinnest on site.

The piezometers could also serve as a long-term tool to measure any changes in hydrology to wetlands from the operation of the groundwater treatment system.

AMERICAN CHEMICAL SERVICES TECHNICAL MEETING. JUNE 12,1996

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